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Editor

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To Whom it May Concern:

Please consider this article written with the theme of “Climate and Safety” in mind. When conducting the background research for this perspective of science chemicals and safety, I quickly found that there was not an abundance of information readily available for teachers and administrators. We have been discussing the ideas for this article for awhile because of their importance to the health and safety of students in schools, in particular. Therefore, this article has not been submitted elsewhere.

Dr. Susan J. Nix currently serves as the Program Chair and Assistant Professor for Educational Leadership at West Texas A&M University. As a previous principal of an elementary school, she encountered safety issues when we faced 9/11 as a nation. Therefore, student safety has been something about which she is passionate.

Mr. Randy J. Nix has two National Board Certifications: Certified Safety Professional and Certified Hazardous Materials Manager, and currently serves as the Managing Director of the Department of Environmental Health and Safety at Texas Tech University. Previous to this career, he served 20 years in the United States Air Force and dealt with the health and welfare of all active duty and civilians on his duty stations.

Thank you, we appreciate your consideration of this article.

Sincerely,

Susan J. Nix

**Safety in the Science Lab**

**By Dr. Susan J. Nix and Randy J. Nix, CSP, CHMM**

With safety being such an important issue in schools for a variety of reasons, it may seem impossible for a principal and teachers to ensure a hazard free environment. Often, school administrators do not have advance information to prevent a crisis situation, but in one area of safety directly related to science instruction, administrators and teachers can make a powerful difference. All over the United States, schools conduct science labs as part of a rigorous curriculum, however, “chemical mismanagement in schools has been an important issue in many states, districts, and localities for some time” (as evidenced in the following report; <http://www.epa.gov/epaoswer/osw/conserve/clusters/schools/pdfs/state.pdf>). It is the storage and handling of science chemicals that can develop into a potentially serious hazard. Imagine the following realistic scenario:

Having just gotten his first job as an alternatively certified science teacher at the High

School level, Mr. Jones was excited at the prospect of setting up the science labs

endorsed by the state curriculum. He had spent years in the field of environmental

health and safety and he was excited about his new career of teaching. As he walked

to the science room, his mind was filled with the idea of repeating the wonderful, rich

experiences he had as a freshman in high school, himself. Opening the storage cabinet

to the chemicals, he expected to see neat rows of labeled containers, but instead, a jumble

of old, rusted and barely legible labeled bottles greeted him. Panic hit the pit of his

stomach. He knew enough from his experiences with environmental health and

safety to know that what he was looking at was a potentially serious hazard.

If you have inherited a science lab with a chemical storage like the one described above, perhaps this information will assist you as you ultimately organize the chemicals. Some may have to be discarded. Others may need to be placed in more suitable containment. Still others may just need to be stored away from the bulk of chemicals because of their potential incompatibility.

Addressing all the potential problems may not be possible in this article, but we hope to get the science teacher on his way to a safer classroom environment, one that can enrich the learning of students with safe hands-on experiences. The first thing a teacher would do in this situation is to:

1. Segregate the chemicals into the following hazard groups; corrosive, flammable, reactive, toxic, and unknown. Some of these will have sub-categories such as acid or base in the corrosive group or air reactive or water reactive in the reactives group. The most problematic and potentially expensive group is the unknowns. Before these can be properly disposed, they must be identified.
2. Next, examine the identifiable chemicals to determine which will be needed for your lessons and which can be considered surplus. Do this for each group with the exception of the unknowns. When you have physically separated what you intend to keep from the surplus, contact the other science teachers in your school district to determine if they can use your surplus. This saves them the cost of the chemicals and also saves the cost of unnecessary disposal at the moment.
3. After chemicals have been taken by others in the school district, make a list or spreadsheet of the remaining chemicals listing name, quantity, type of container, and your assigned hazard group. Do this for the unknowns as well, including any information on their containers.
4. If you have a large research or industrial facility nearby, contact them and ask if they have a hazardous waste disposal contractor under contract and if so, get the company’s contact information. Contact the company to ask: a) when they will be in the area next, and b) if you can fax your list of chemicals for a disposal estimate. The fact that they were already going to be in the area should allow them to give you a better price. You might also ask if they would be willing to handle your hazardous waste at the same prices as the facility from which you got their contact information. Most companies will do this.
5. Contact your state environmental agency to arrange for a one-time shipment of hazardous waste. They will have a number of questions about the hazardous waste and how it was generated. Depending on your state and the amount of hazardous waste you are shipping, they may require you to register as a hazardous waste generator. If so, you will most likely be registered as a conditionally exempt small quantity generator (CESQG). This is the lowest level of generator with the fewest regulatory requirements.
6. Be sure any agreement with the hazardous waste disposal contractor includes the stipulation that they will complete all necessary manifesting and associated documentation since this can be quite complex for anyone unfamiliar with it. Most likely you will need the assistance of someone in your district with the authority to sign the manifests as the generator.
7. Also include in the agreement that you must receive a certificate of disposal or certificate of treatment for each manifested item. This is for the future protection of the district. You should receive a signed copy of the manifest back within thirty days of shipment showing your hazardous waste has reached its destination and signed for by somebody at that facility. It is important that you retain these documents for a minimum of three years.

While the above procedures certainly apply to science laboratories, they may also apply in other areas of the district. Pesticides, herbicides, and many other industrial chemicals must be properly disposed of to comply with federal and state laws. Hopefully this information has given you some helpful guidance regarding disposal of unwanted chemicals.

This article is certainly not presented as all you may need to know in dealing with hazardous waste. If you encounter something outside the scope of this article, please contact an environmental professional for assistance. Many environmental professionals offer volunteer assistance to school districts at no cost.

In addition to environmental professionals, the United States Department of Education lists a downloadable document: <http://www.ed.gov/admins/lead/safety/emergencyplan/crisisplanning.pdf> that contains a plethora of information for use by schools concerning the organization and response to a crisis situation. Included in the same document is an appendix of resources listing federal websites and contacts as well as individual state school safety centers. For example, the state of Texas site is: [www.txssc.txstate.edu/txssc.htm](http://www.txssc.txstate.edu/txssc.htm) and was developed in 1999, “to serve as a central location for school safety information, and to provide schools with research, training, and technical assistance to reduce youth violence and promote safety in the state.”

A report conducted in partnership with the Environmental Protection Agency and several schools provides data addressing chemical risks in schools, and states the following, “Dangerously mismanaged chemicals represent one of the critical environmental health and safety issues schools must address to improve the learning environment for children and to provide a healthy workplace for teachers and staff,” (<http://www.epa.gov/epaoswer/osw/conserve/clusters/schools/pdfs/recommend.pdf>).

“Instead of assuming a sense of security, schools, large and small, are making safety concerns an integral part of the educational mission” (Babcock, 2004). With some suggestions about how to catalogue the chemicals found in a school science lab, the teacher, administrators and school district can proactively prevent unnecessary accidents.

References

Babcock, R. R. (March, 2004). The ABC’s of Safety: Latest trends in security and life-safety for educational facilities. Buildings. ([www.buildings.com](http://www.buildings.com)).